Medtronic

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InterOffice Memo

REF: MJJ04229/md

To: Bozidar Ferek-Petric

From: Michael J. Jaro IR51

Date: April 9, 1998

RE: INTERNET AND CARDIAC PACING SYSTEMS
P-8027

CC: **Hal Patton**
Lani Dick

I herewith acknowledge receipt of your Idea Disclosure entitled "INTERNET AND CARDIAC PACING SYSTEMS".

It has been assigned the number P-8027 and has been forwarded to the legal department in Minneapolis. A detailed evaluation of the disclosure will be made.

Thank you for disclosing this to Medtronic. Medtronic values very highly the inventiveness and creativity of its engineers and welcomes all new ideas.

Kind regards,

Michael J. Jaro
Secretary European Patent Review Board

Medtronic

P8027.00

Bakken Research Center B.V.
Attn: The Chairman of the
European Patent Review Board
Endepolsdomein 5
6229 GW Maastricht
The Netherlands

IDEA SUBMITTAL AGREEMENT

Gentlemen,

Please receive and evaluate my disclosure (attached) of an Idea ("Idea" includes Ideas, confidential information, patent applications and completed inventions) for:

Internet & Cardiac Pacing Systems

under the following conditions:

INVENTORSHIP

I am the originator or am rightfully representing the originator of this Idea, am of legal age and have the right to disclose this Idea to the Bakken Research Center B.V, of Medtronic Inc., (Medtronic).

PURPOSE

I am disclosing my Idea to allow Medtronic to evaluate my Idea as they deem appropriate and determine their interest in negotiating for any rights therein. I understand my Idea may be disclosed to those employees or consultants of Medtronic obligated to treat this information in confidence.

CONFIDENTIALITY

Medtronic considers itself to be a member of the general public for the purpose of receiving the disclosure of the Idea. For a period of time ending twelve (12) months from the date this Agreement is signed, Medtronic will exercise the same degree of care to maintain in confidence the Idea as they exercise to protect their own confidential information. Medtronic will not,
however, be obligated under this Agreement with respect to any Idea or part thereof which:

a. is publicly available as of the date Medtronic receives your disclosure or becomes publicly available through no fault of Medtronic;
b. is released or published by me in writing (e.g. by publication of articles or patent applications);
c. is obtained from third parties who did not directly or indirectly receive the information from me;
d. is previously known to or is subsequently developed by Medtronic independently of my disclosure; or
e. is inadvertently disclosed by a Medtronic employee who has no direct or indirect knowledge of my disclosure under this Agreement.

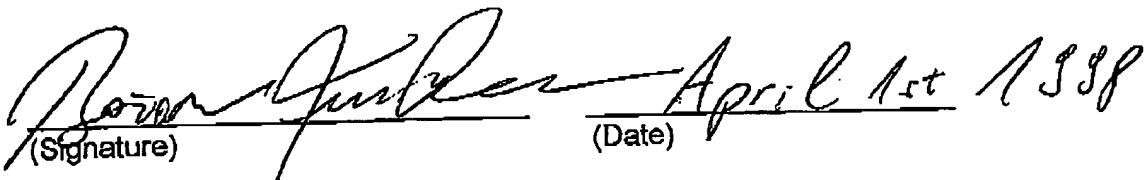
PERIOD

After the twelve (12) month period ends, Medtronic shall not have any express or implied obligation to me or liability for their disclosure, use or non-use of this Idea, and any related or unrelated Ideas I disclose to them in the course of its evaluation, whether use commences before or after the twelve (12) month period ends except as may arise independently of this Agreement, under valid patents I may obtain on inventions contained in the disclosed Idea.

LAWS

This Agreement shall be governed by the laws of The Netherlands and there are no additional understandings, agreements or representations expressed or implied which are not specified herein.

Yours sincerely,



(Signature) April 1st 1998 (Date)

Božidar Ferek-Petrić
Medtronic B.V.
Trg Dražena Petrovića 3
10000 Zagreb
Croatia
Tel: 003851-4843-689
Fax: 003851-4843-701
GSM: 00385-98-22-88-90

INTERNET & CARDIAC PACING SYSTEMS

Pacemaker patients have to come to the pacemaker centre according to the prescribed individual schedule to either diagnose or likely to prevent the hazardous events. The hazard can occur from either an impending pacing system failure, a cardiac pacing malfunction and disturbance, or a cardiac arrhythmia. Many complications occur transiently, therefore being hardly detected. Accordingly, a problem can remain to be undetected if the follow-up schedule is to rare.
In brief, major problems of follow-up today are:
- 20% patients totally dependent on cardiac pacing;
- most of malfunctions develop fast;
- patient dependence on pacemaker centre support;
- public or private transport expenses of the patient or health care;
- transtelephonic monitoring is inferior in modern pacemakers having sophisticated telemtry and diagnostic functions.

Especially in Croatia, patients travel several hours to the pacemaker centre in order to complete the follow-up session in a few minutes. Our company has developed the Remote Assistant which gives the opportunity for self-control in Kappa 700 pacemakers, being the first pioneering step to solve this problem. Intermedics develops autocontrollable pacemaker with muscle twitching alarm and showed some first results (Dr.Fahraeus) on NASPE and european congresss (PACE Vol.21, No.1/Part II page 256).
We developed an experimental system for the remote follow-up utilizing the Internet infrastructure. The goal is to develop a special pacemaker programmer which would be connected to the network. Patient, being in a general practice physician's office, would be connected by an ECG cable to the programmer having the programming wand over the implanted unit. Remote workstation, installed in a pacemaker centre and operated by a pacemaker expert, would have complete GUI of the programmer including telemetry and diagnostic readouts. I believe that this will be the method of pacemaker follow-up in the next century.
We developed custom hardware and software whereby utilising the WEB technology and the client-server configuration. A standard pacemaker programmer is connected to the server Sun SparcStation 4. We designed a special interface providing the server with the digitized ECG signal. The client computer has no special hardware, and runs the client software. Client and server are connected by a TCP/IP network link. It may be any kind of permanent network link, or a dial-up modem connection. The server software has three major tasks: it handles the client's requests, dispatches the patient's ECG waveform in real time and ensures the patient's security. The client software has two major tasks: to display the incoming data in real time and to communicate the cardiologist's command to the server and therefore has a GUI of a standard pacemaker programmer. The network traffic flows through the two separate channels. One TCP connection carries the occasional commands and the state updates. This channel is reliable but slow having high latency, therefore being feasible for interrogation of the network connection reliability. The waveform data is transmitted in UDP packets. The UDP packets comprise a significantly small header and their arrival doesn't generate a confirmation message to the sender. That reduces the network traffic, thus helping the real-time operation of the system. The client GUI comprises command buttons for opening the menus for limited number of pacemaker parameters determination. Utilizing either the Netscape 3.0 or the HotJava 1.0 browser, both having completely compatible implementation of the Java VM, we were able to present the client GUI as a Java applet. The ECG signal of various simulated arrhythmias was displayed in real time with sufficient quality for pacemaker patients clinical monitoring. We were able to remotely program the implemented programming functions, whereby changing the pacing rate, the pacemaker output and switching the vario function for the threshold test. The link has to provide

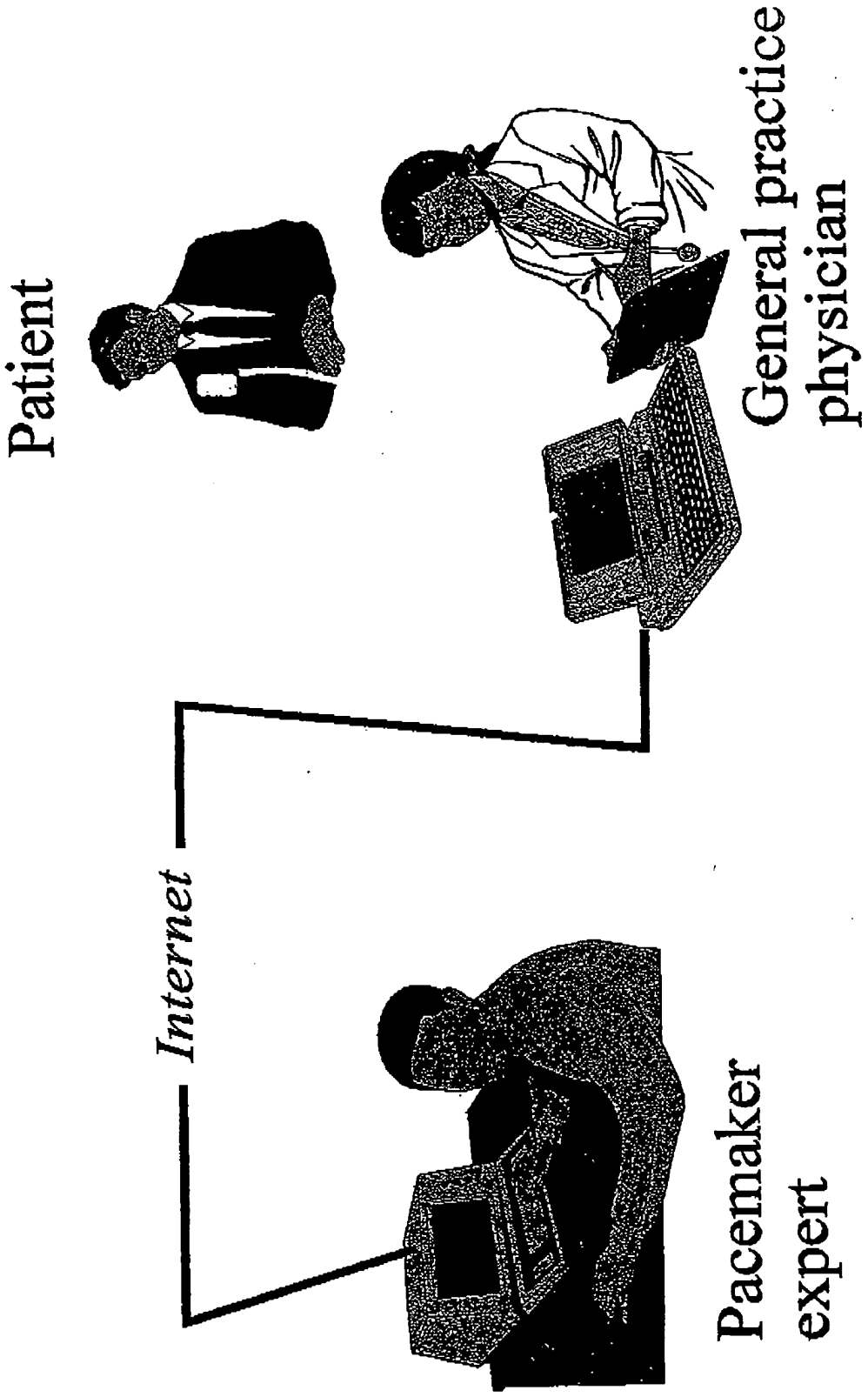
at least a constant 19,200 bps throughput rate. As it is difficult to guarantee this quality of service on standard TCP/IP networks, I believe that only dial-up connection is feasible at present. Nevertheless, development of the Internet infrastructure is directed towards much faster and more reliable connections via ISDN or even fiber-optic ATM networks.

Here is an initial proposal for claim 1:
A device for remote programming of the implantable cardiac therapy device, comprising computer capable to run client software and remote computer capable to run server software and to exchange the data with said implantable device, characterized that said client displays GUI of the programming device being capable to remotely program said implantable device and remotely display telemetric and diagnostic data of said implantable device, whereby said client and said server being mutually connected by a computer network.

We can also add a pico Java like processor to the implantable units for processing of the telemetry and programming channel. In that case thhe claim 1 would be:
An implantable cardiac therapy device comprising means for telemetry measurements and diagnostic data collection being capable to transmitt its status, measurements results, collected diagnostic data and IEGM, characterized that said device comprises a microprocessor dedicated to generate Java applets whereby said status, said measurements results, said IEGM and said data are transmitted as Java applets.

I would like to suggest the prior art search fields:

Sun Microsystems piko-Java chip
Sun Microsystems Java computer language
Client-server industrial control solutions
Programming and telemetry systems
Transtelephonic follow-up systems



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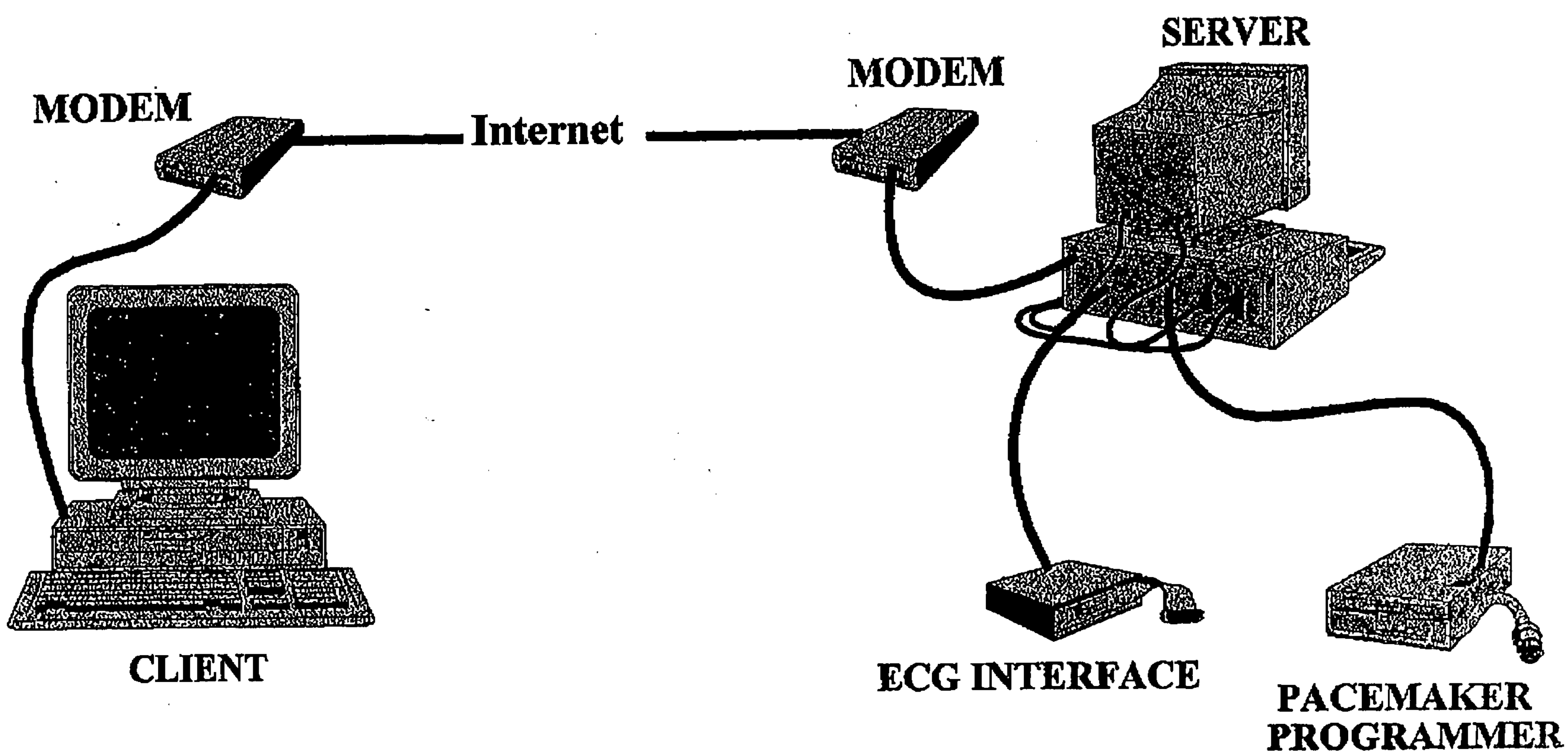
Practical Experimental System



Utilization of WEB technology

PAGE 18/24 * RCVD AT 2/24/2005 5:45:47 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/4 * DNIS:8729306 * CSID:7635146982 * DURATION (mm-ss):06-16
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Medtronic

P 8027-00
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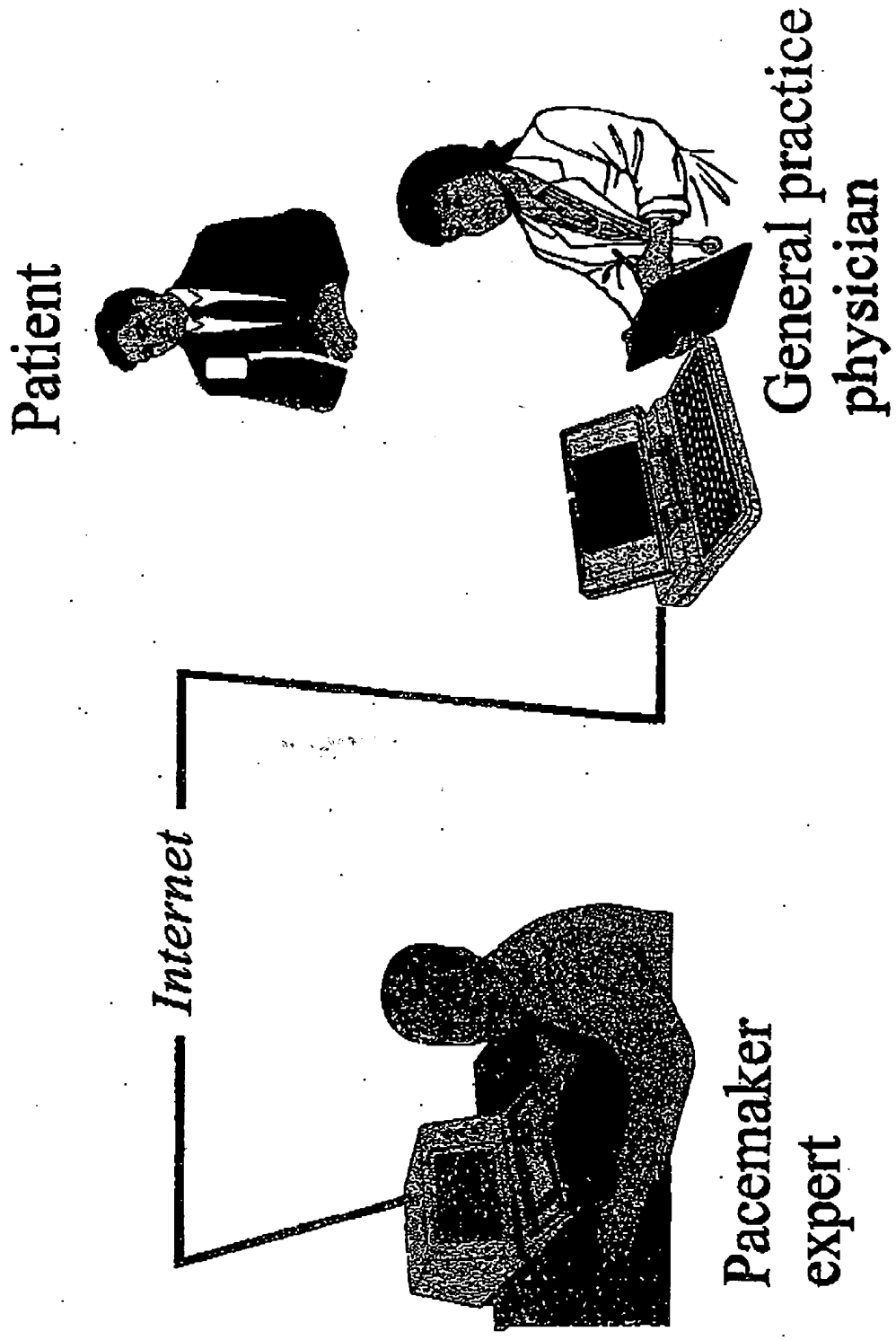

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I would like to suggest the prior art search fields:

Sun Microsystems piko-Java chip
Sun Microsystems Java computer language
Client-server industrial control solutions
Programming and telemetry systems
Transtelephonic follow-up systems

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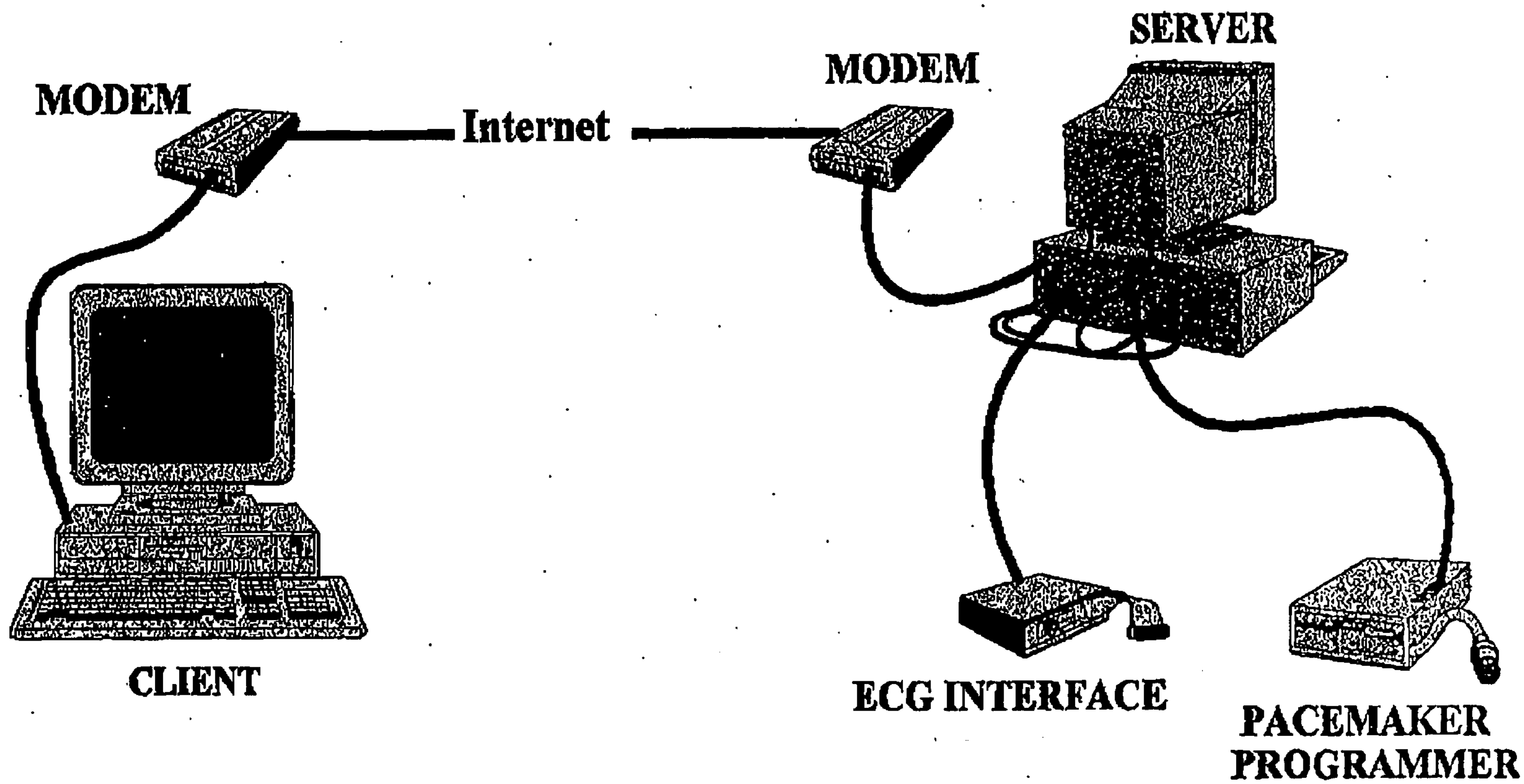
Practical Experimental System



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